

Claims:

1. An acidic aqueous composition useful for polishing tungsten and titanium on a semiconductor wafer comprising by weight percent 0.5 to 10 abrasive, 0.5 to 9 oxidizer, 0.1 to 5 complexing agent, 0.1 to 5 chelating agent and balance water, wherein the abrasive is fumed silica that has a surface area of greater than 90 m²/g and has only been exposed to an acidic pH.
2. The composition of claim 1 wherein the abrasive has a surface area of greater than 130 m²/g.
3. The composition of claim 1 wherein the oxidizer is an iodate, including, its acids, salts, mixed acid salts, esters, partial esters, mixed esters, and mixtures thereof.
4. The composition of claim 1 wherein the complexing agent is selected from the group comprising: phosphate, pyrophosphate, metaphosphate, hypophosphate, polyphosphate, phosphonate, including, their acids, salts, mixed acid salts, esters, partial esters, mixed esters, and mixtures thereof.
5. The composition of claim 1 wherein the chelating agent is a carboxylic acid, including, their salts and mixtures thereof.
6. The composition of claim 1 wherein the aqueous composition has a pH of 3.5 to 4.5.
7. An acidic aqueous composition useful for polishing tungsten and titanium on a semiconductor wafer comprising by weight percent 0.5 to 10 abrasive, 0.5 to 9 iodate oxidizer, 0.1 to 5 potassium pyrophosphate, 0.1 to 5 lactic acid and balance water, wherein the abrasive is fumed silica that has a surface area of greater than 90 m²/g and has been dispersed and diluted entirely in an acidic pH.
8. The composition of claim 8 wherein the abrasive has a surface area of greater than 130 m²/g.

9. A method useful for polishing tungsten and titanium on a semiconductor wafer comprising:

contacting the tungsten and titanium on the wafer with an acidic polishing composition, the polishing composition comprising by weight percent 0.5 to 10 abrasive, 0.5 to 9 oxidizer, 0.1 to 5 complexing agent, 0.1 to 5 chelating agent and balance water, wherein the abrasive is fumed silica that has a surface area of greater than $90 \text{ m}^2/\text{g}$ and has only been exposed to an acidic pH; and

polishing the tungsten and titanium with a polishing pad.

10. The method of claim 1 wherein the abrasive has a surface area of greater than $130 \text{ m}^2/\text{g}$.